

Optimization of Temperature Difference Formula at Thermoacoustic Cryocooler Stack with Genetic Algorithm

Authors : H. Afsari, H. Shokouhmand

Abstract : When stack is placed in a thermoacoustic resonator in a cryocooler, one extremity of the stack heats up while the other cools down due to the thermoacoustic effect. In the present, with expression a formula by linear theory, will see this temperature difference depends on what factors. The computed temperature difference is compared to the one predicted by the formula. These discrepancies can not be attributed to non-linear effects, rather they exist because of thermal effects. Two correction factors are introduced for close up results among linear theory and computed and use these correction factors to modified linear theory. In fact, this formula, is optimized by GA (Genetic Algorithm). Finally, results are shown at different Mach numbers and stack location in resonator.

Keywords : heat transfer, thermoacoustic cryocooler, stack, resonator, mach number, genetic algorithm

Conference Title : ICCEUT 2016 : International Conference on Combustion, Energy Utilisation and Thermodynamics

Conference Location : Paris, France

Conference Dates : January 21-22, 2016